Title: PATTERN WRITING SYSTEM AND PATTERN WRITING METHOD
Inventor(s): Tadahiro OHMI, et al.
DOCKET NO.: 039262-0142

10/552731

FIG. 1

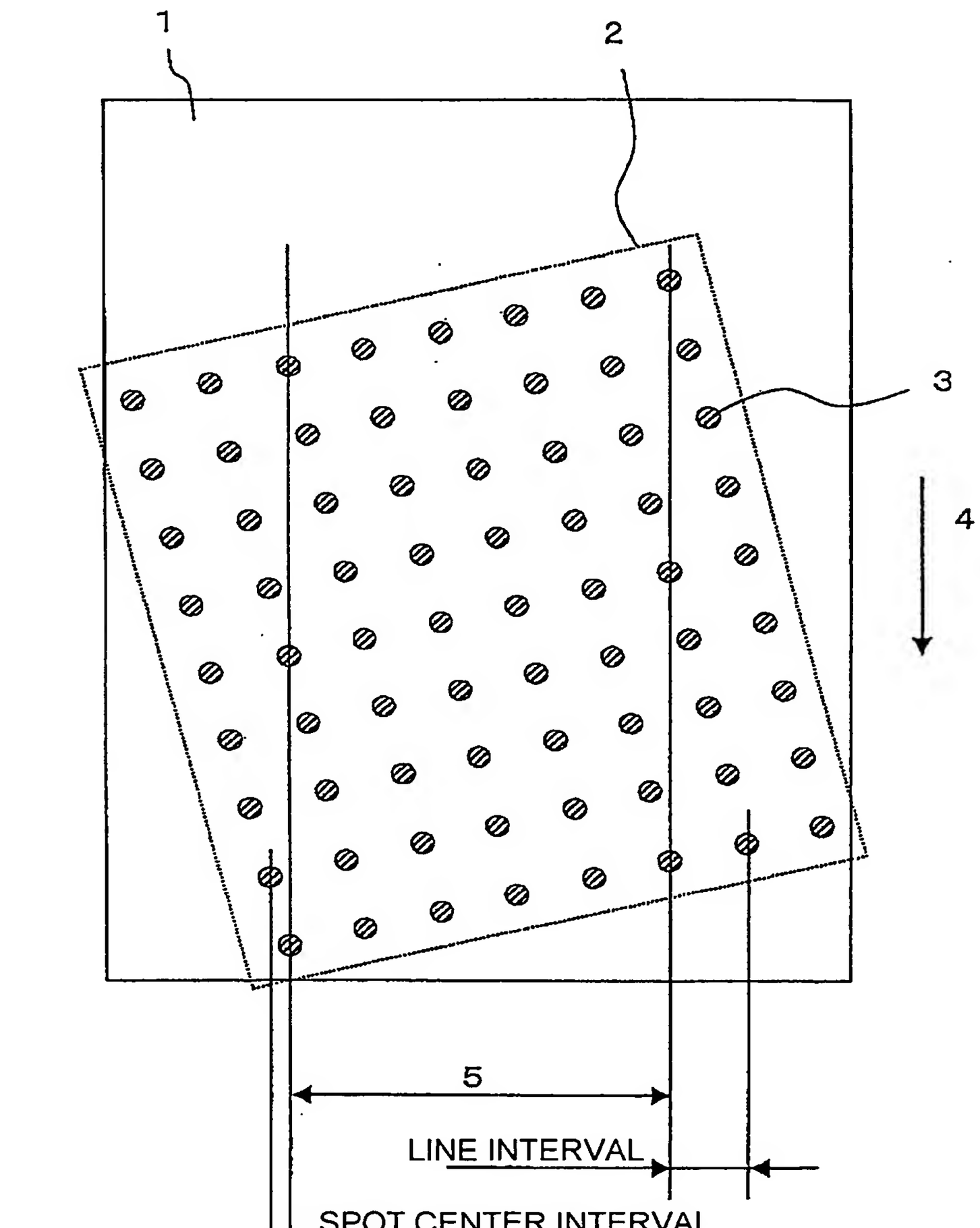


FIG. 2

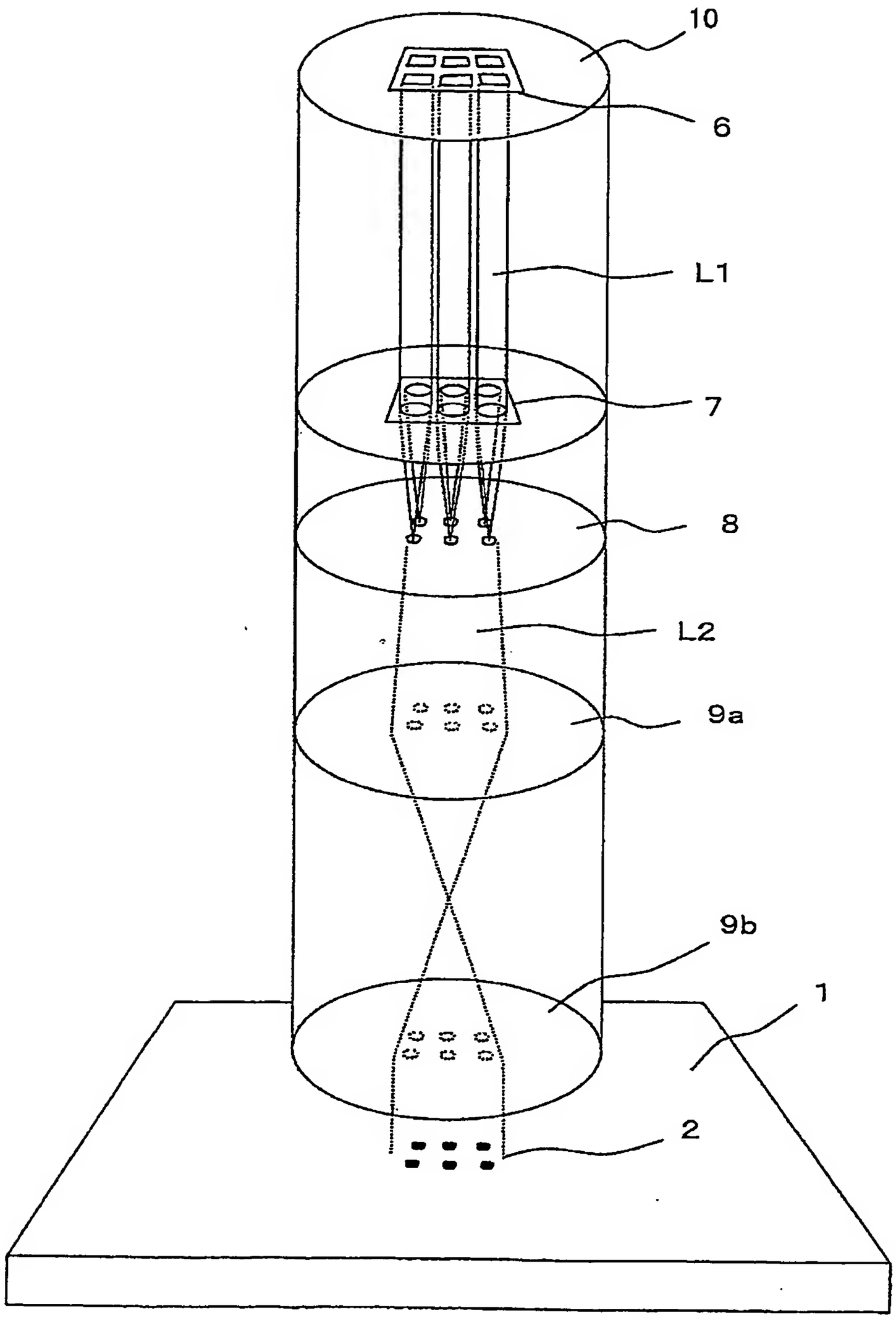


FIG. 3

(a) FORMULAS

SPOT CENTER INTERVAL (D) = d・G

NUMBER OF SPOTS BETWEEN LINES (N) = (Y-1)/(G-1)～Y/G

LINE INTERVAL (S) = D・N

EFFECTIVE EXPOSURE WIDTH (W) = (X-2G)・S

NUMBER OF SCAN TIMES (m) = XM/W

SCAN SPEED (V) = D・f

WRITING TIME (T) = (YM/V)・m

(b) EXPLANATION OF SYMBOLS

G : NUMBER OF GRADATIONS

d : MINIMUM GRID SIZE ON SUBSTRATE

(X, Y) : NUMBER OF MICROMIRROR PIXELS (TRANSVERSE DIRECTION, LONGITUDINAL DIRECTION)

(XM, YM) : WRITING AREA IN SUBSTRATE (TRANSVERSE DIRECTION, LONGITUDINAL DIRECTION)

f : MICROMIRROR DEFLECTION FREQUENCY (Hz)

(c) DESIGN EXAMPLE

G = 64 GRADATIONS

d = 1.56nm

X = 2048、Y = 512

XM = 132mm、YM = 100mm

f = 2,000Hz

(d) CALCULATION RESULTS

D = 1.56nm × 64 = 0.10μm

N～512/64 = 8

S = 0.10μm × 8 = 0.8μm

W = (2048 - 2 × 64) × 0.8μm = 1.536mm

m = 132mm/1.536mm=86 TIMES

V = 0.10 μm × 2,000 = 0.2mm/s

T = (100mm/0.2) × 86 = 43000s～12h

FIG. 4

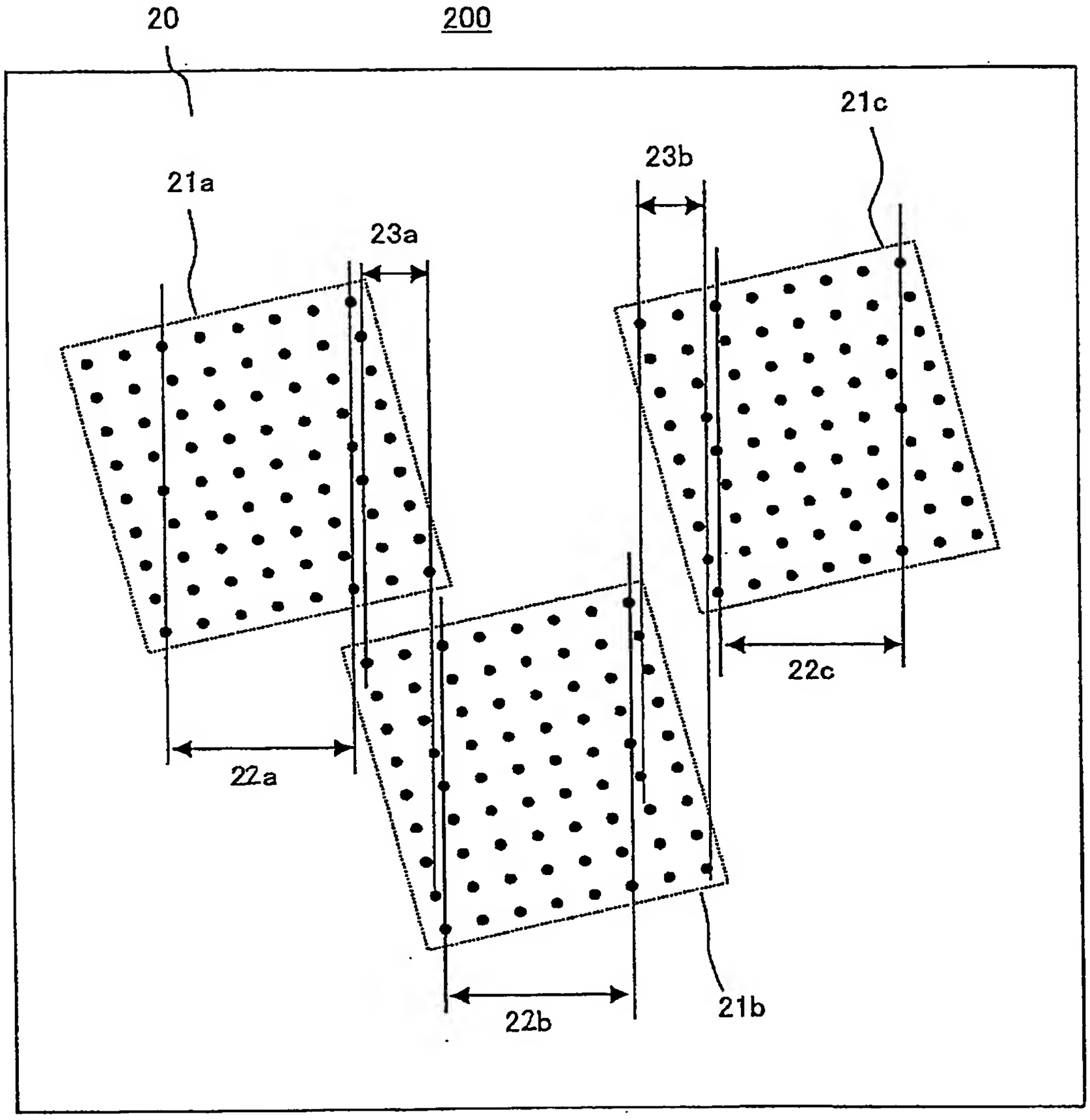
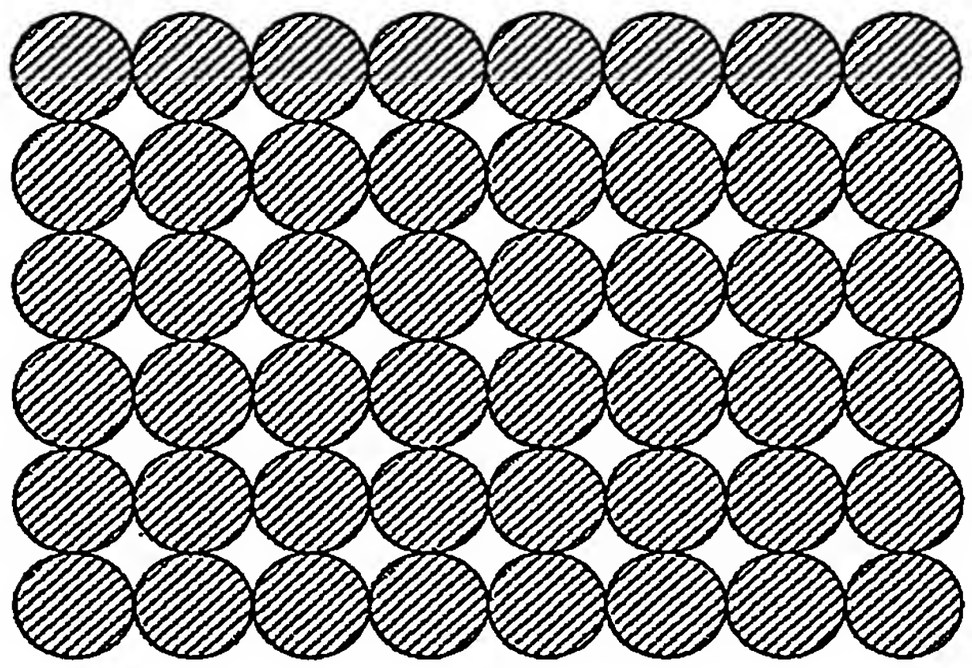


FIG. 5

(a)



(b)

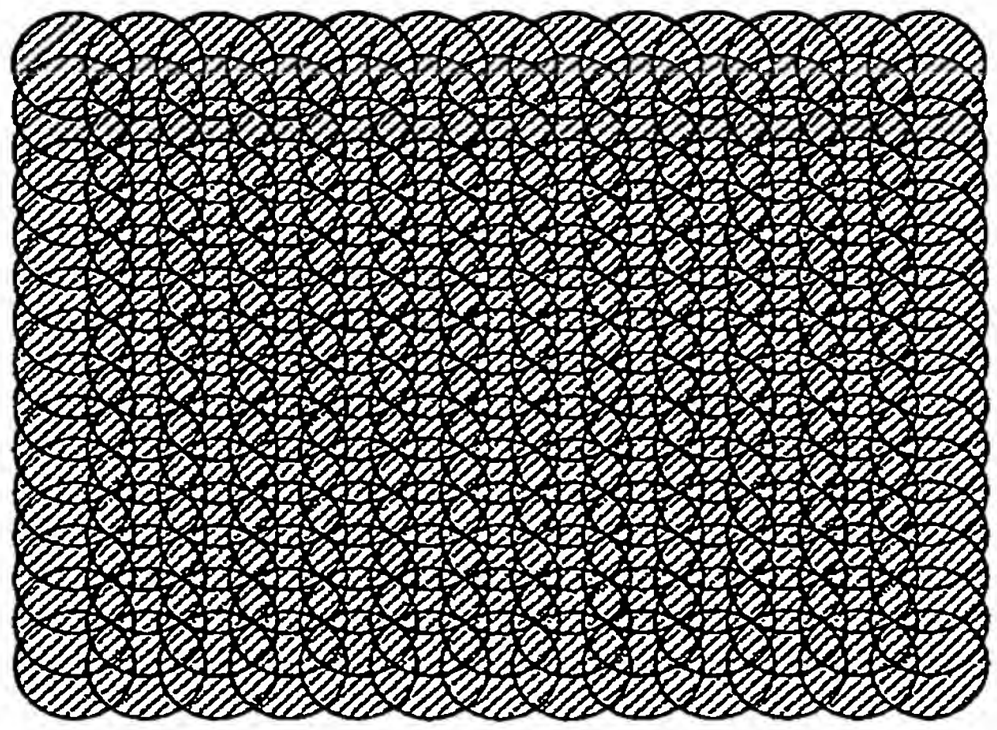


FIG. 6

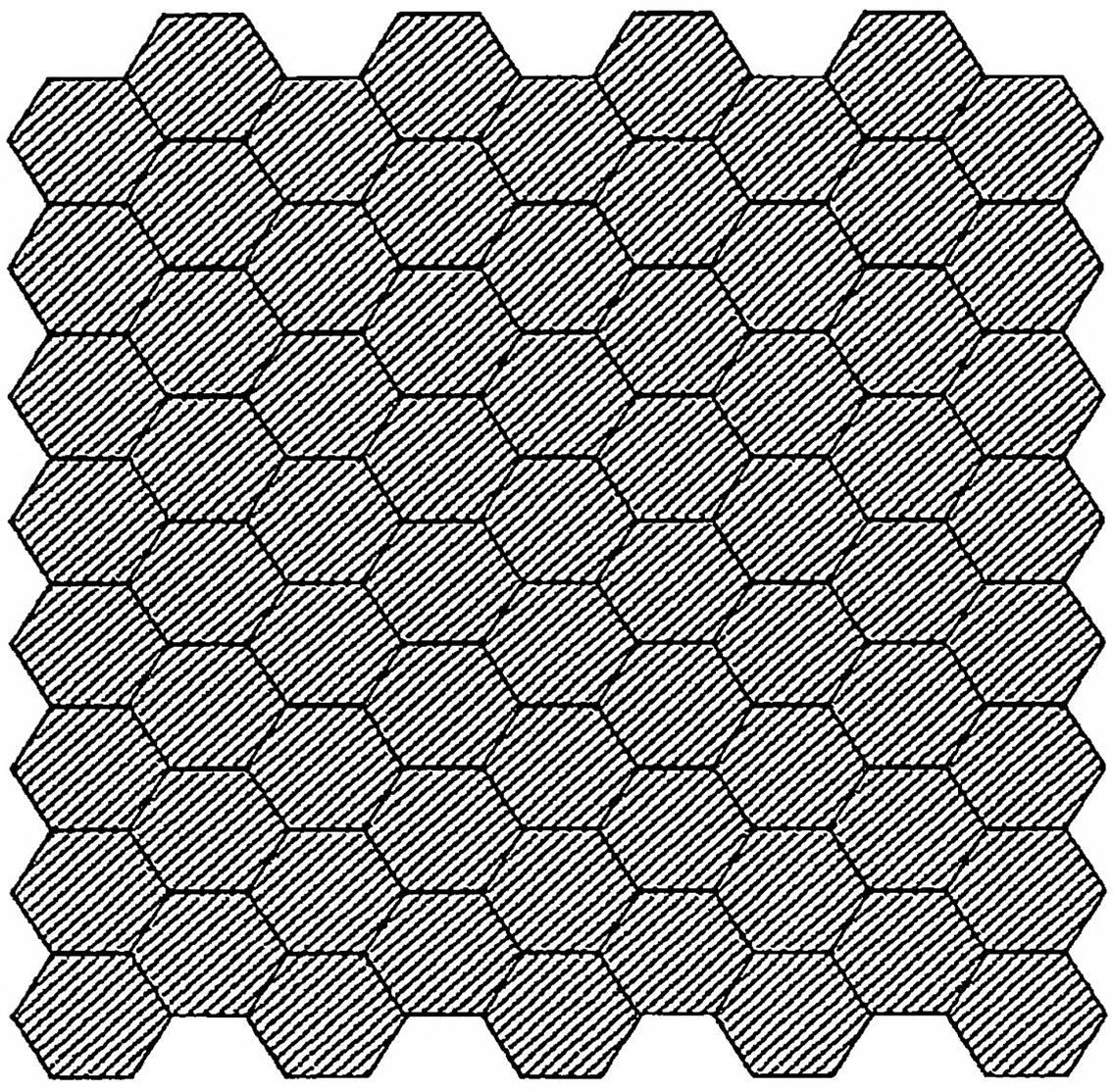


FIG. 7

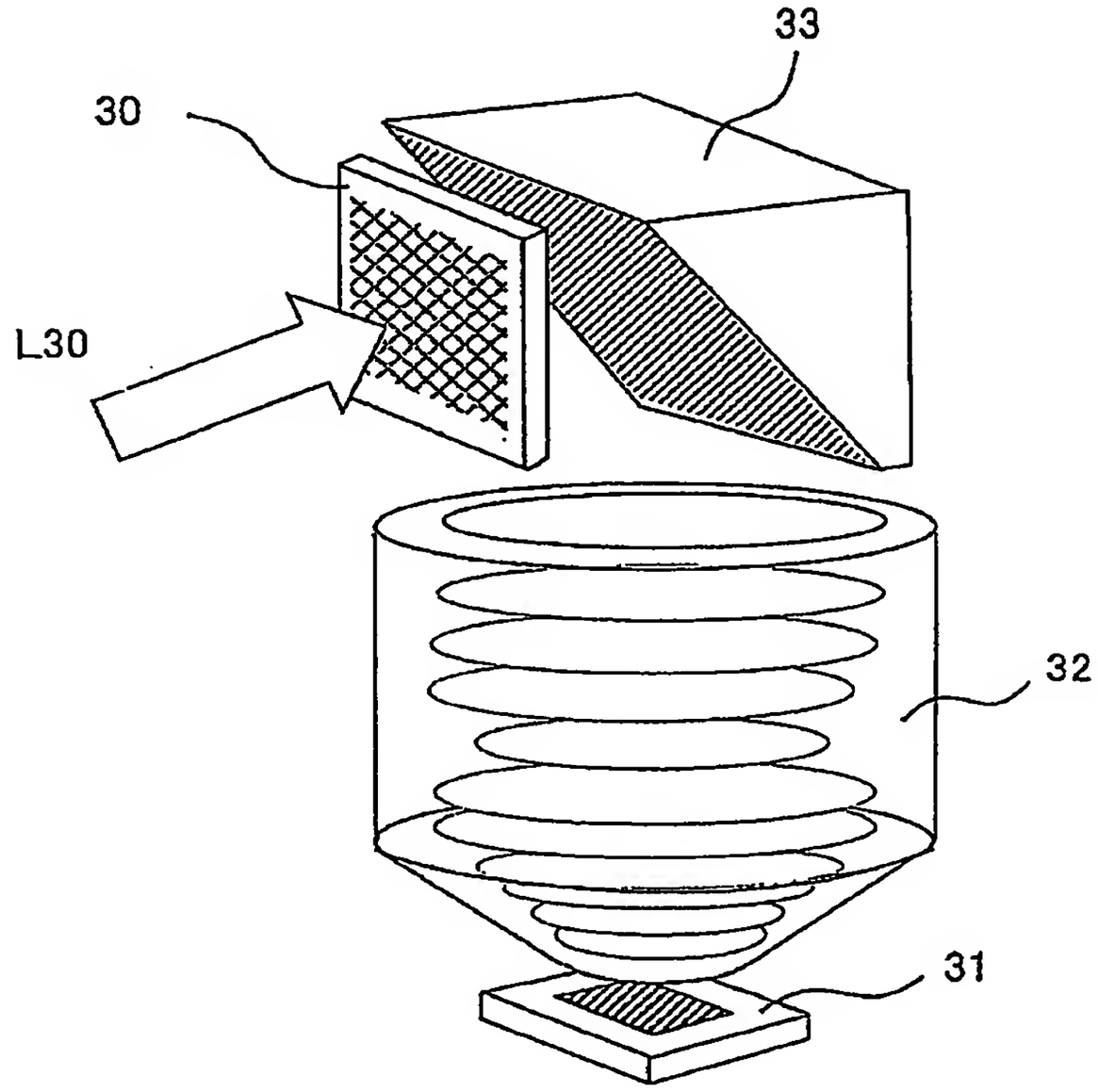


FIG. 8

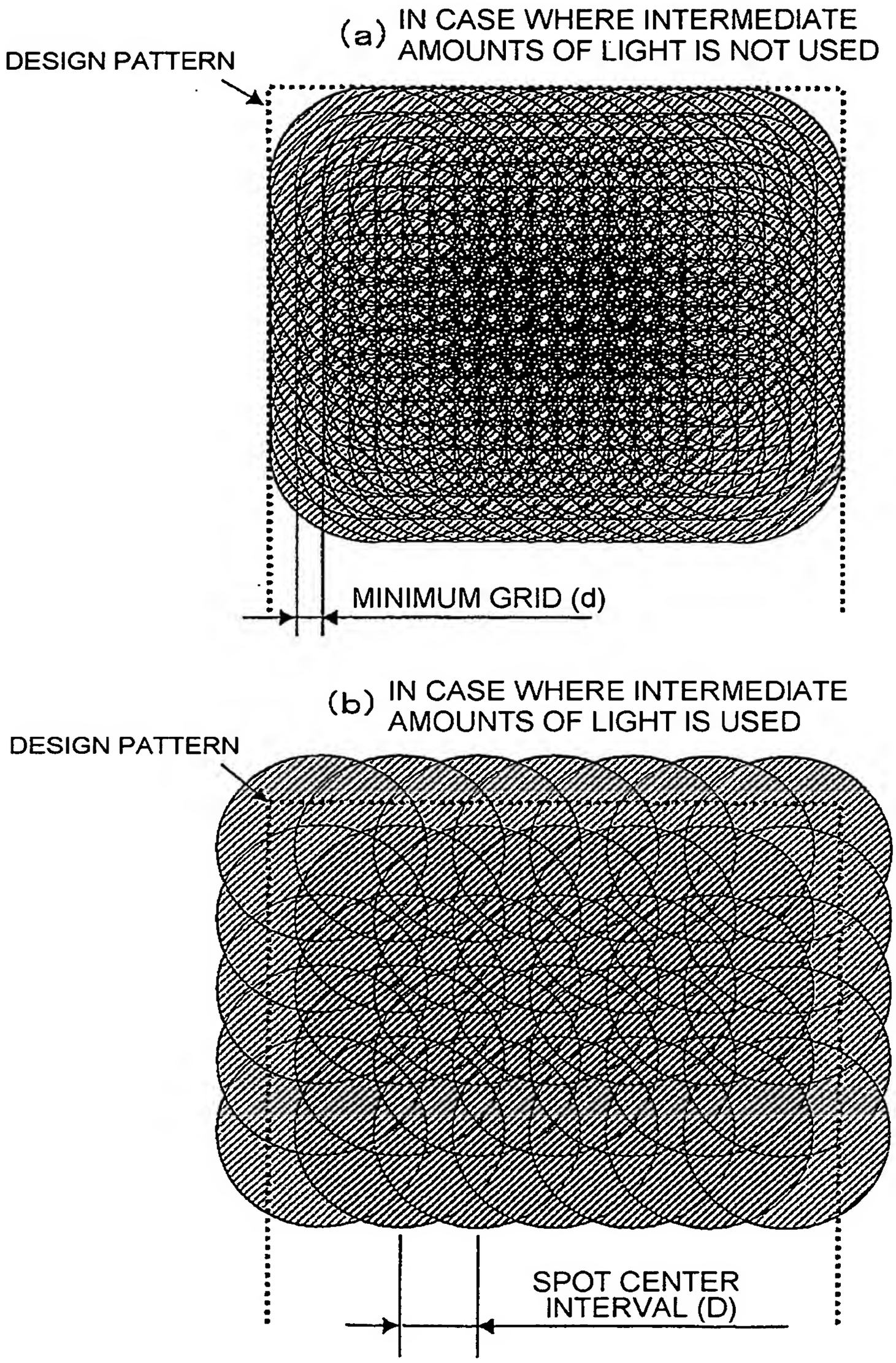

(a) IN CASE WHERE INTERMEDIATE AMOUNTS OF LIGHT IS NOT USED
DESIGN PATTERN
MINIMUM GRID (d)
(b) IN CASE WHERE INTERMEDIATE AMOUNTS OF LIGHT IS USED
DESIGN PATTERN
SPOT CENTER INTERVAL (D)

FIG. 9

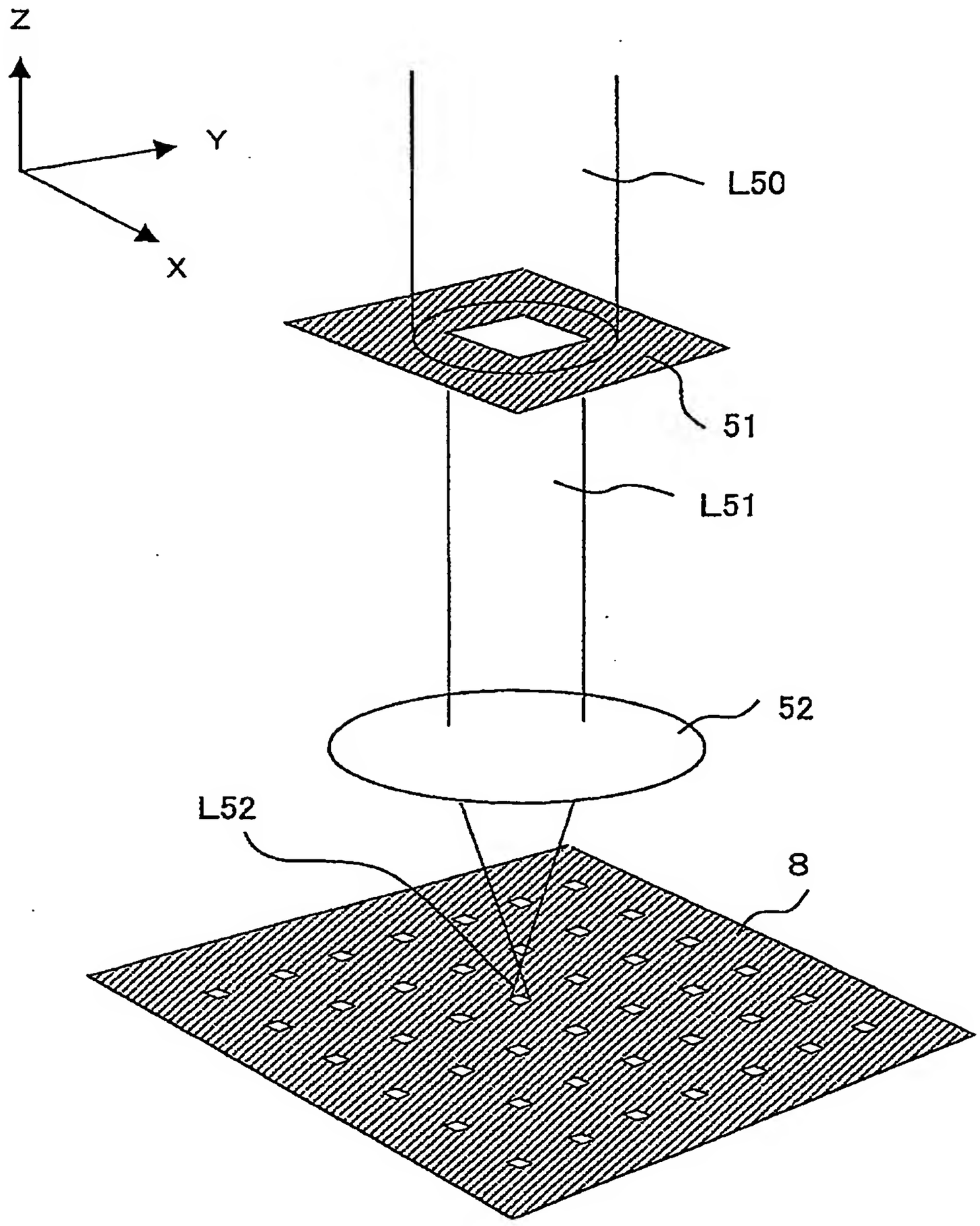


図 10

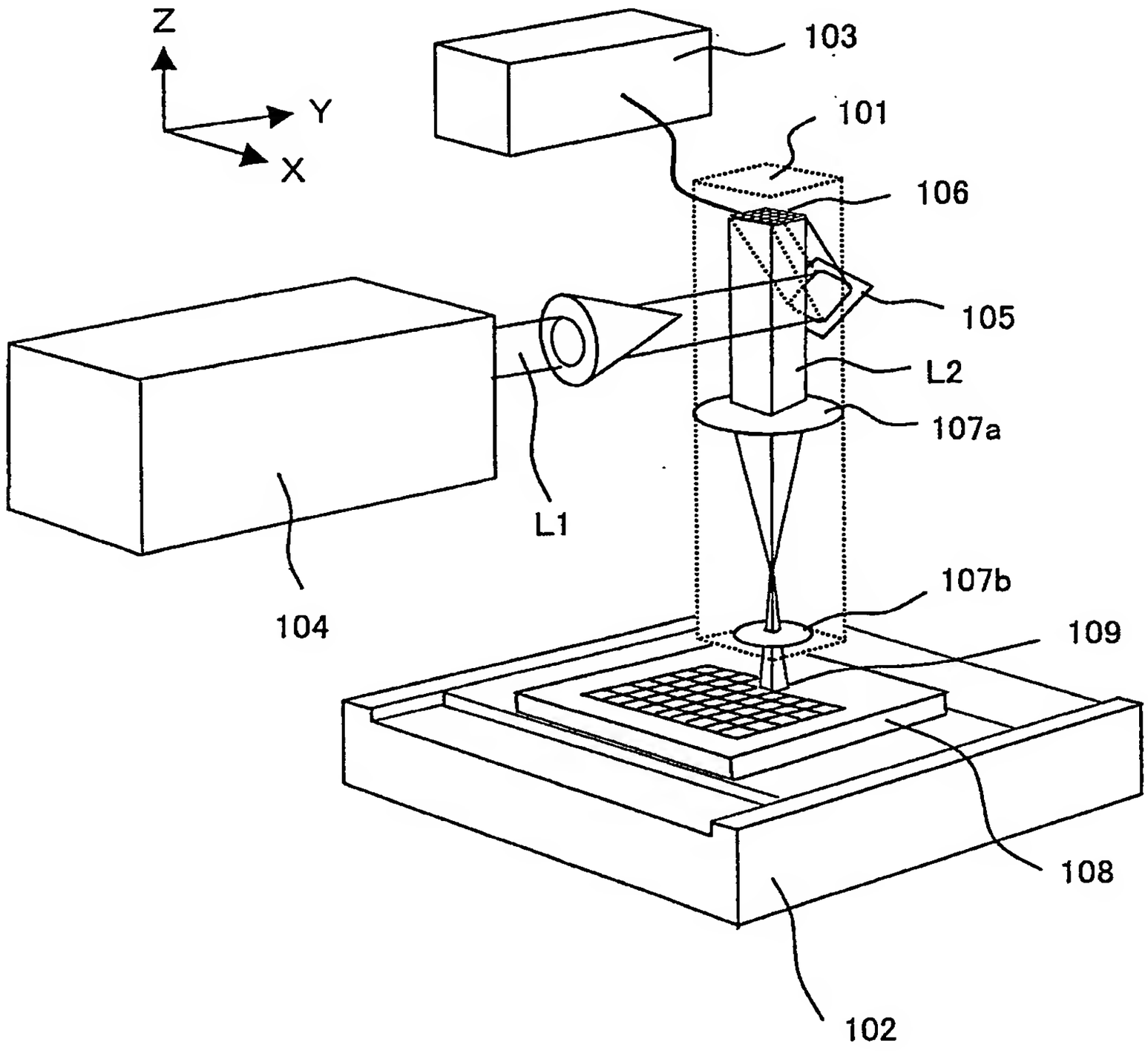


FIG. 11

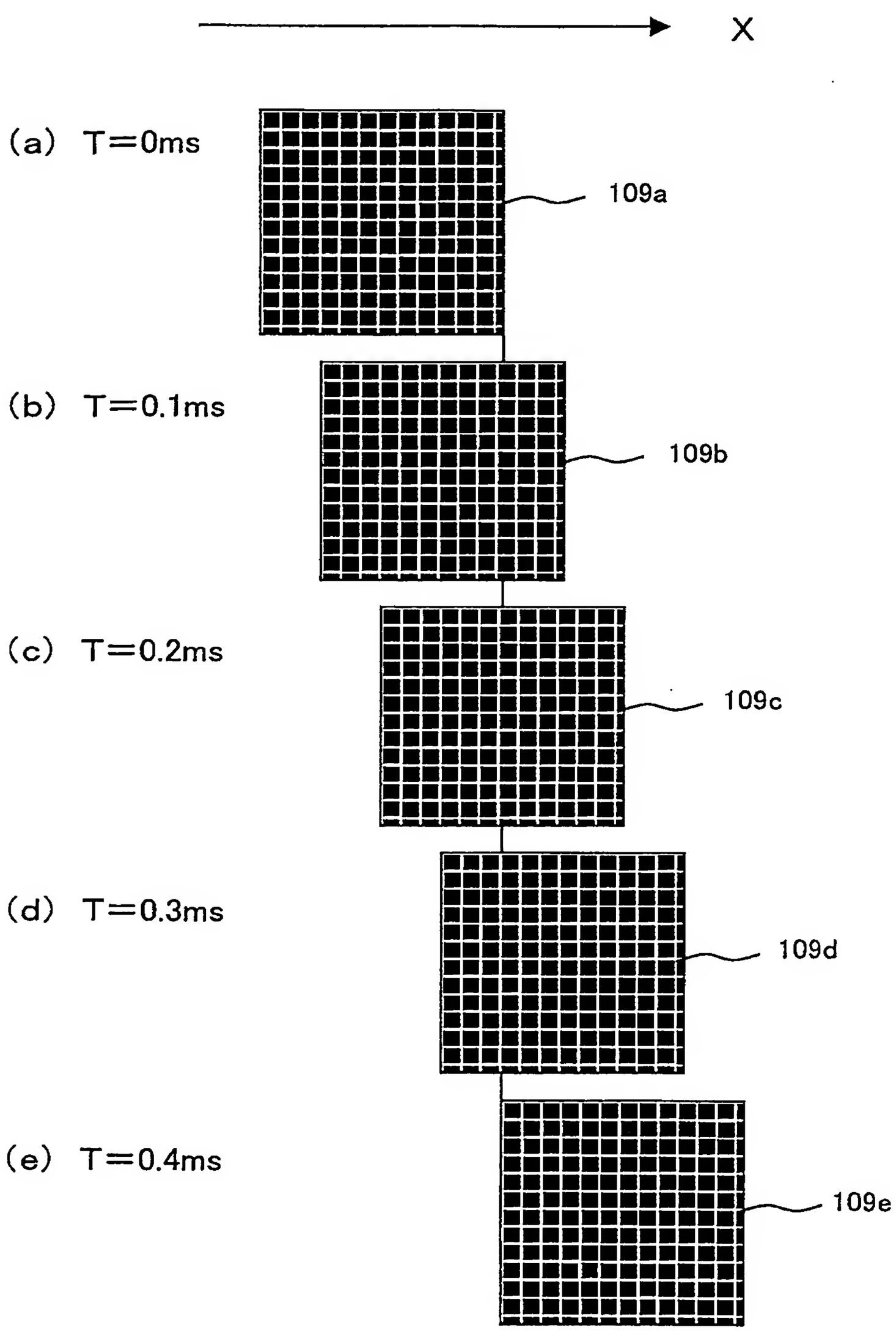
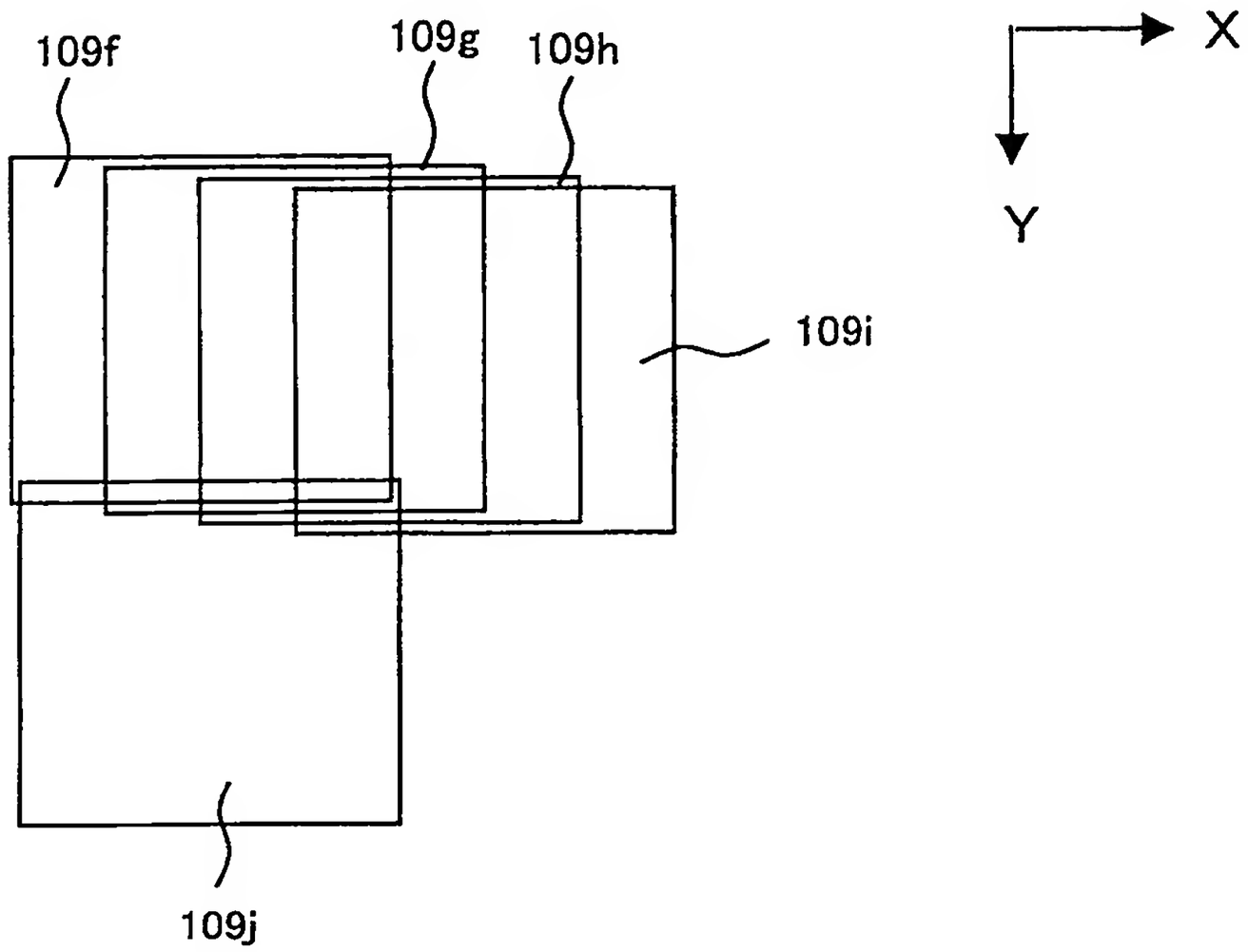

X
(a) T=0ms
109a
(b) T=0.1ms
109b
(c) T=0.2ms
109c
(d) T=0.3ms
109d
(e) T=0.4ms
109e

FIG. 12

(a)


109f
109g
109h
109i
109j
X
Y

(b)

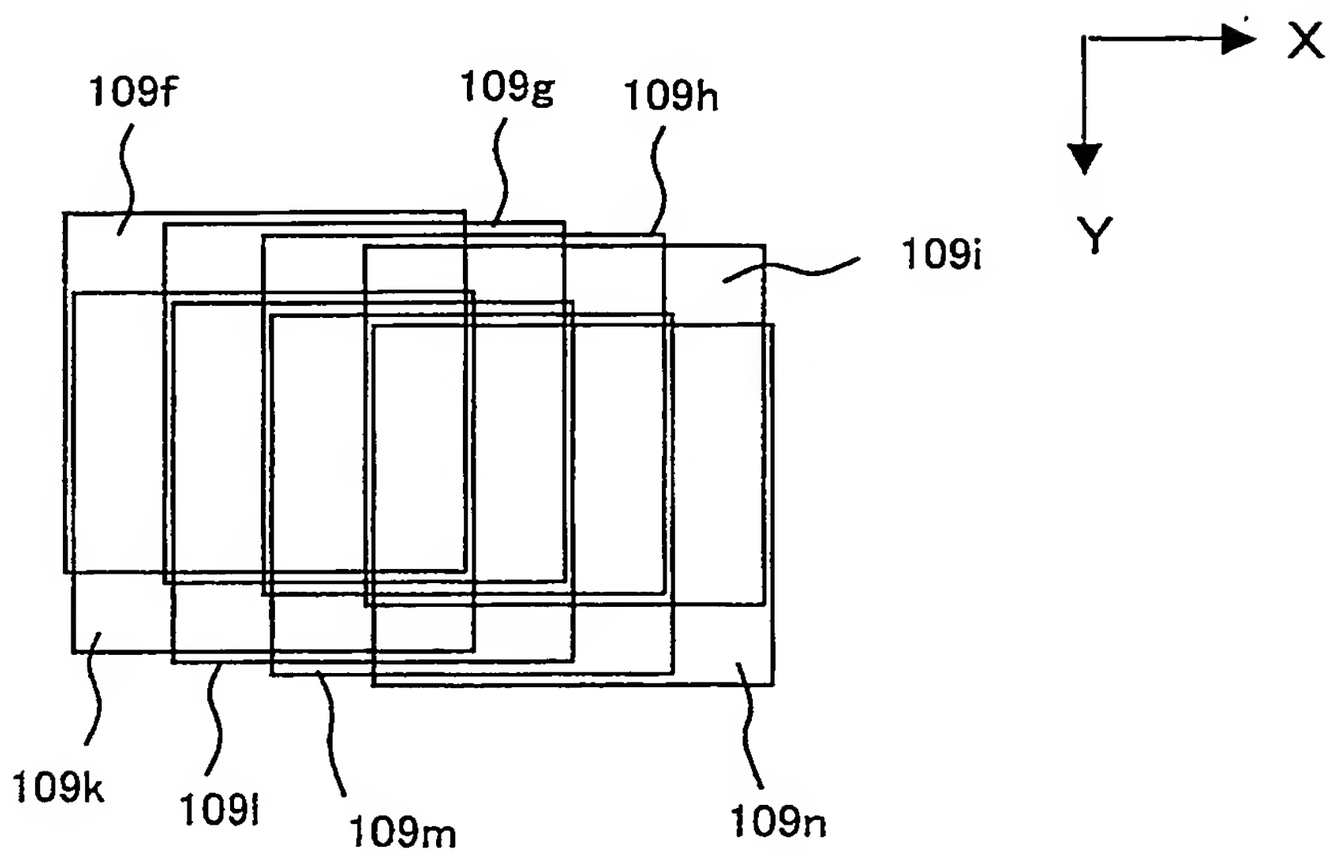

109f
109g
109h
109i
109k
109l
109m
109n
X
Y

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FIG. 13

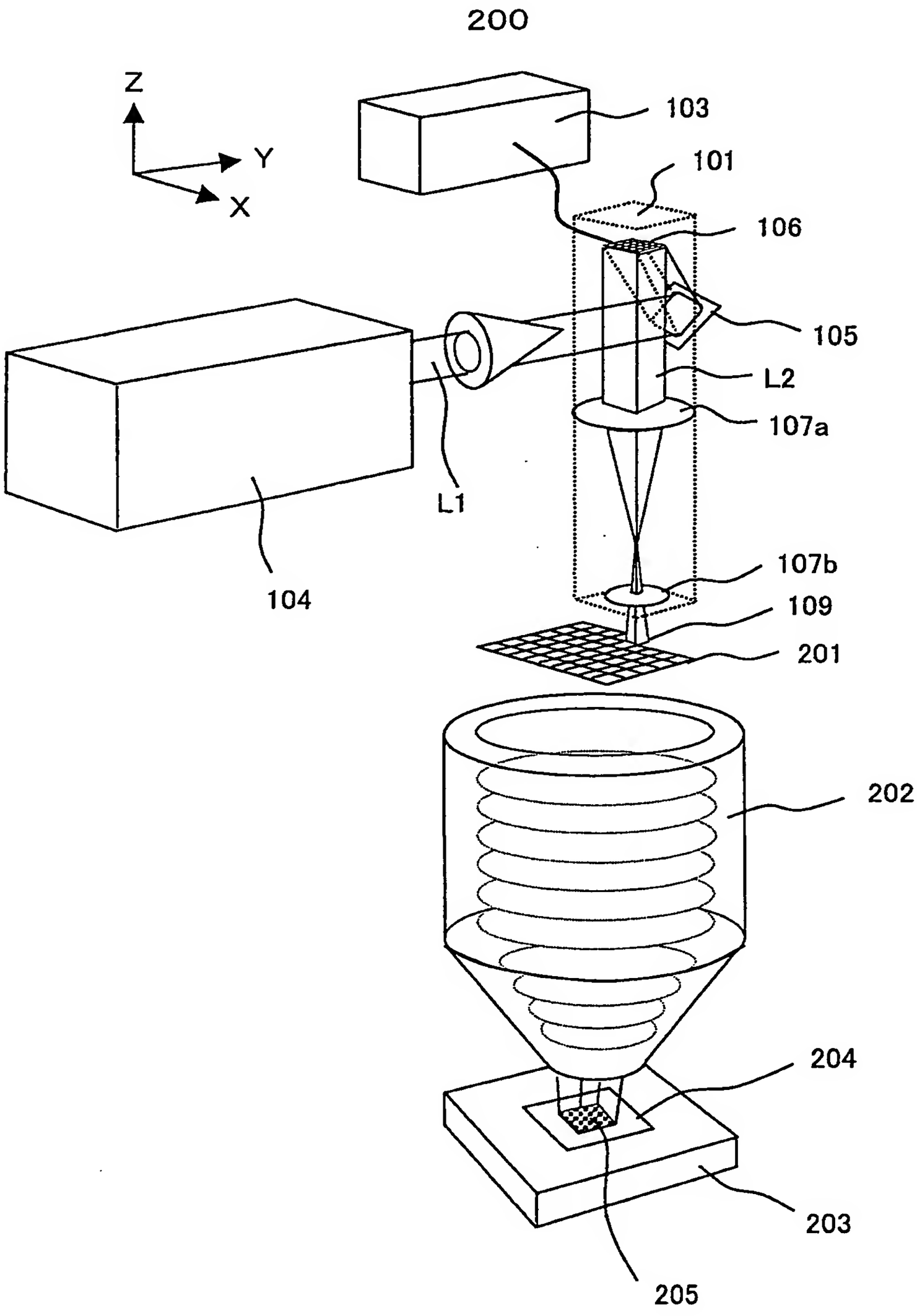

FIG. 14

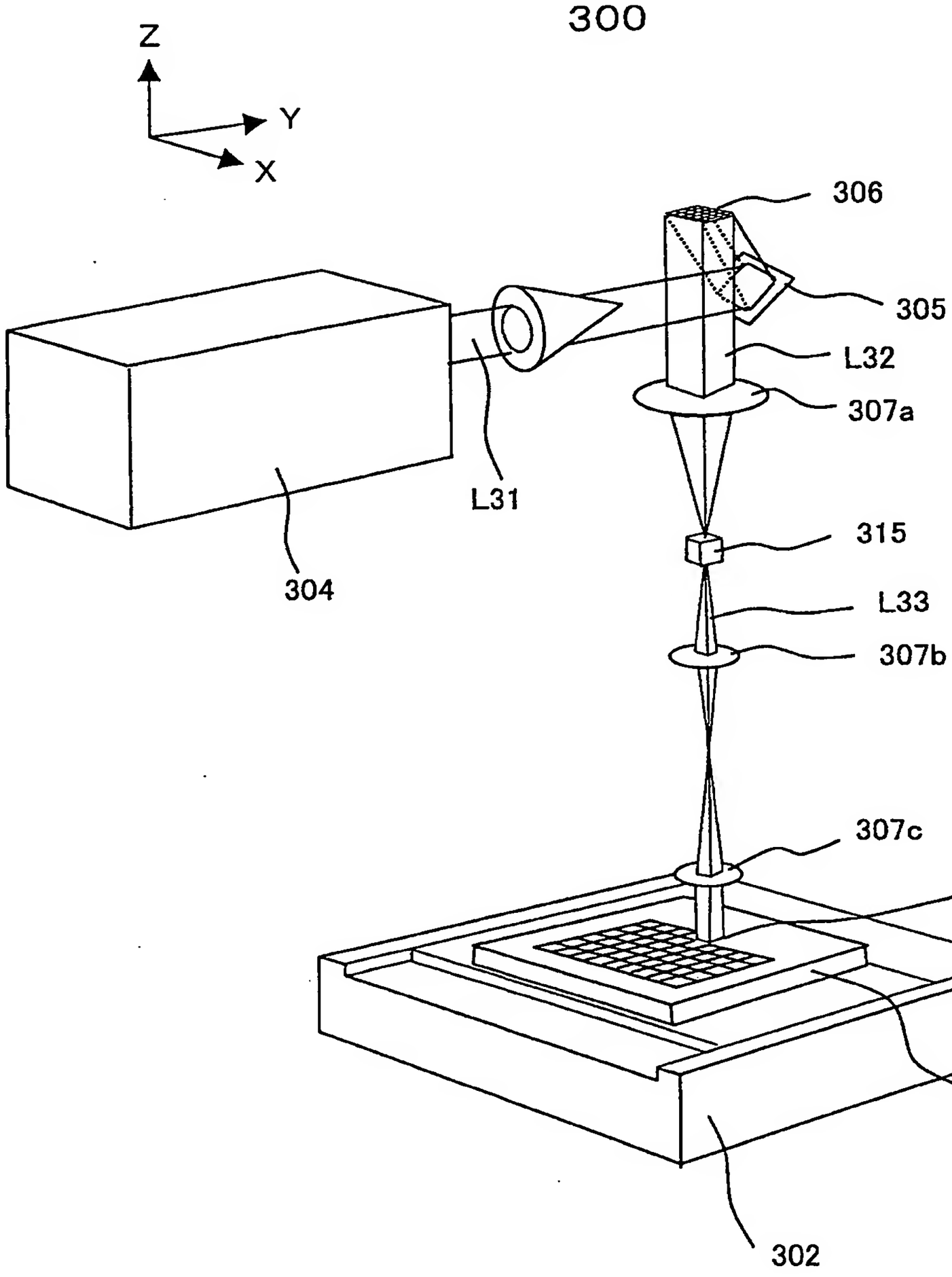

FIG. 15

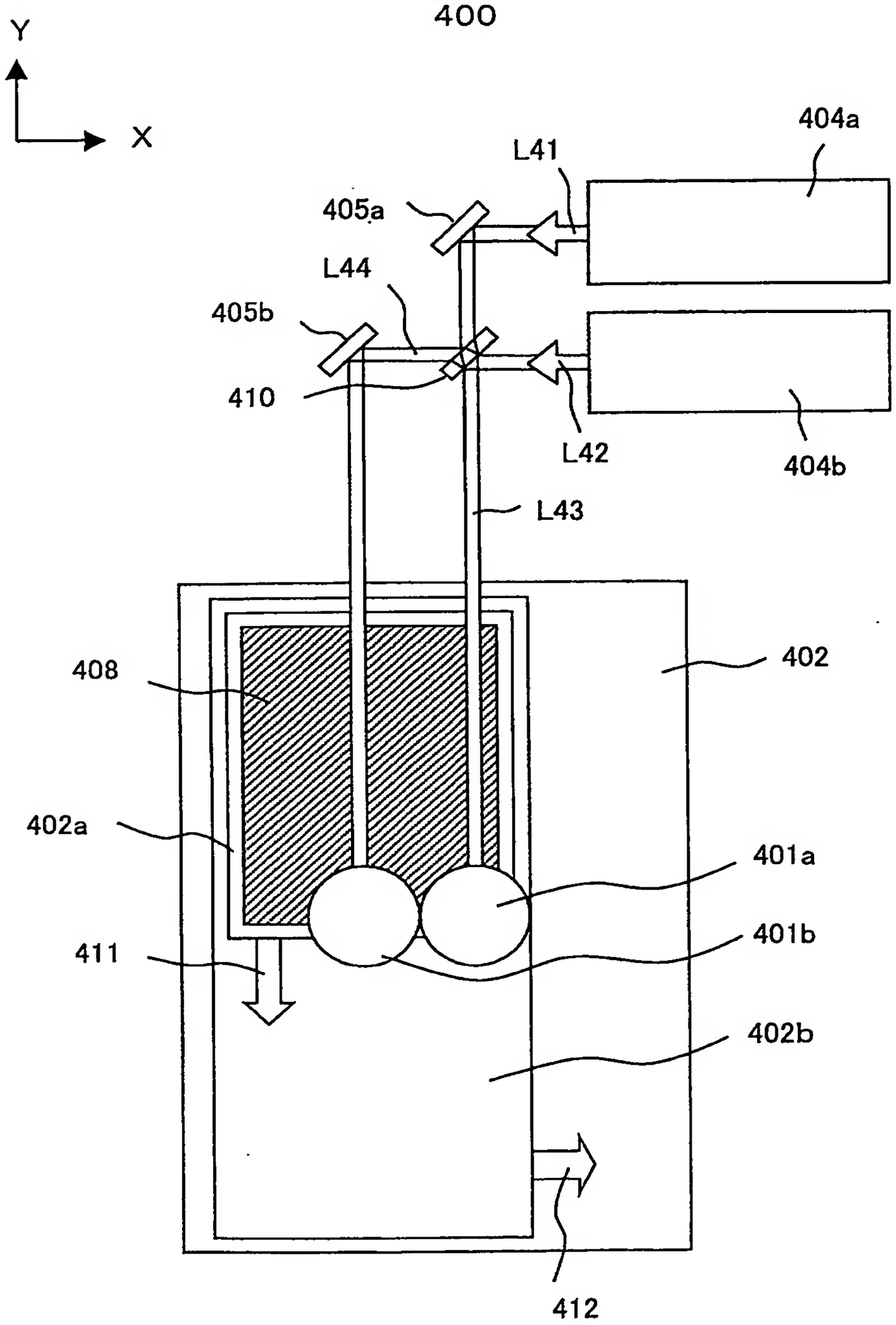
400
Y
X
404a
L41
405a
L44
405b
410
L42
404b
L43
408
402
402a
401a
401b
411
402b
412

FIG. 16

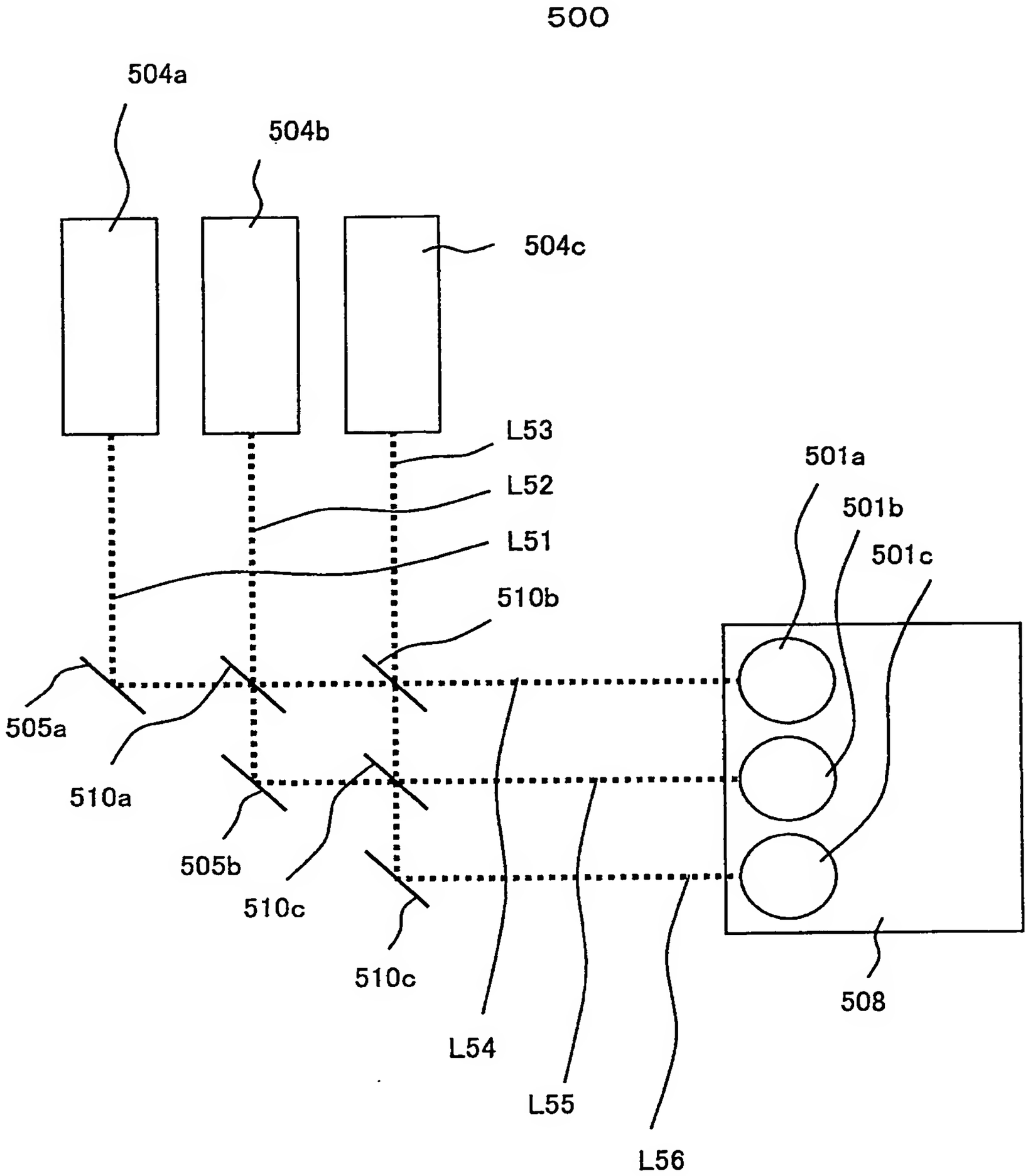
500
504a
504b
504c
L53
L52
L51
510b
501a
501b
501c
505a
510a
505b
510c
510c
L54
L55
L56
508

FIG. 17

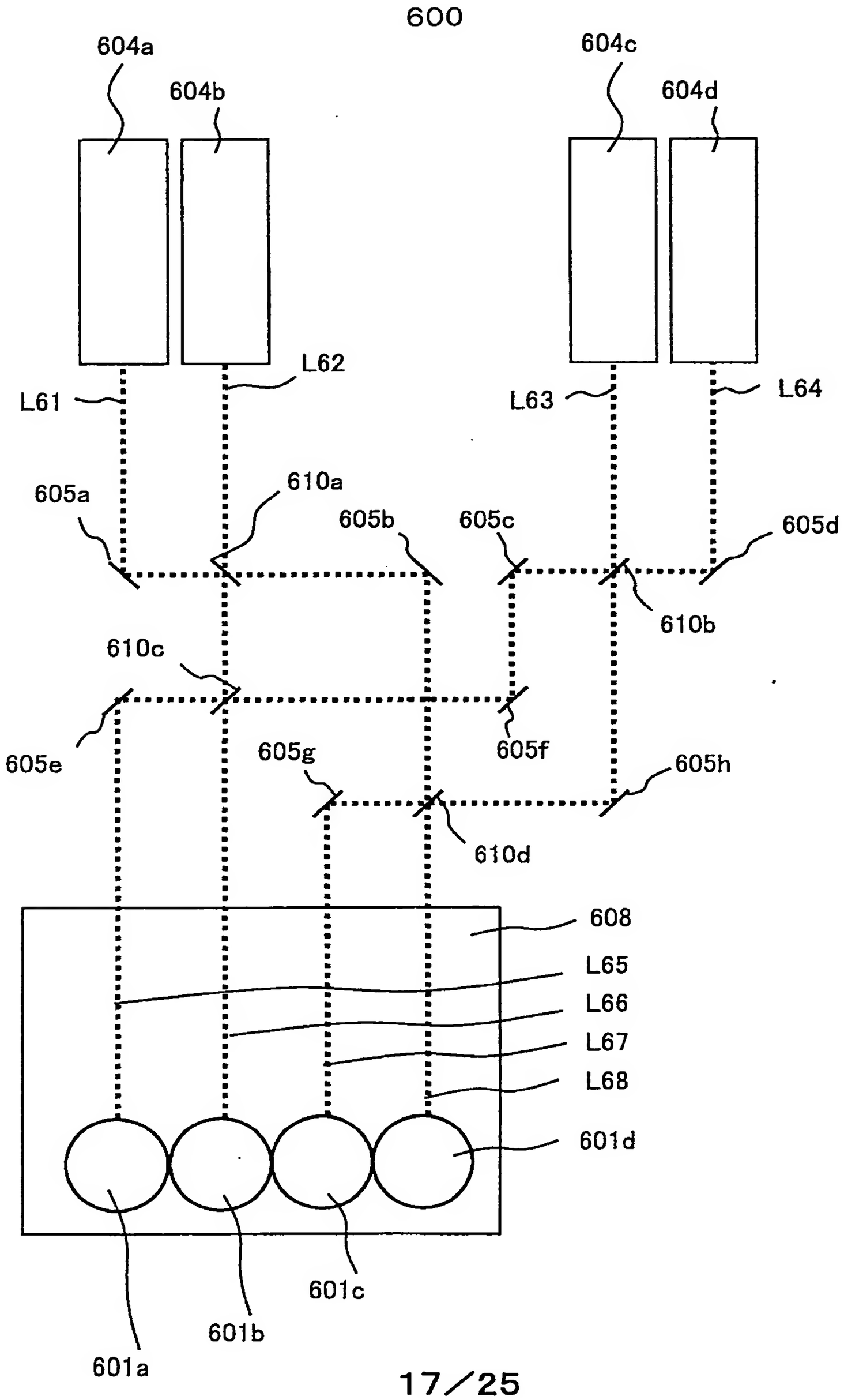
600
604a
604b
604c
604d
L61
L62
L63
L64
605a
610a
605b
605c
605d
610b
610c
605e
605f
605g
605h
610d
608
L65
L66
L67
L68
601d
601c
601b
601a

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FIG. 18

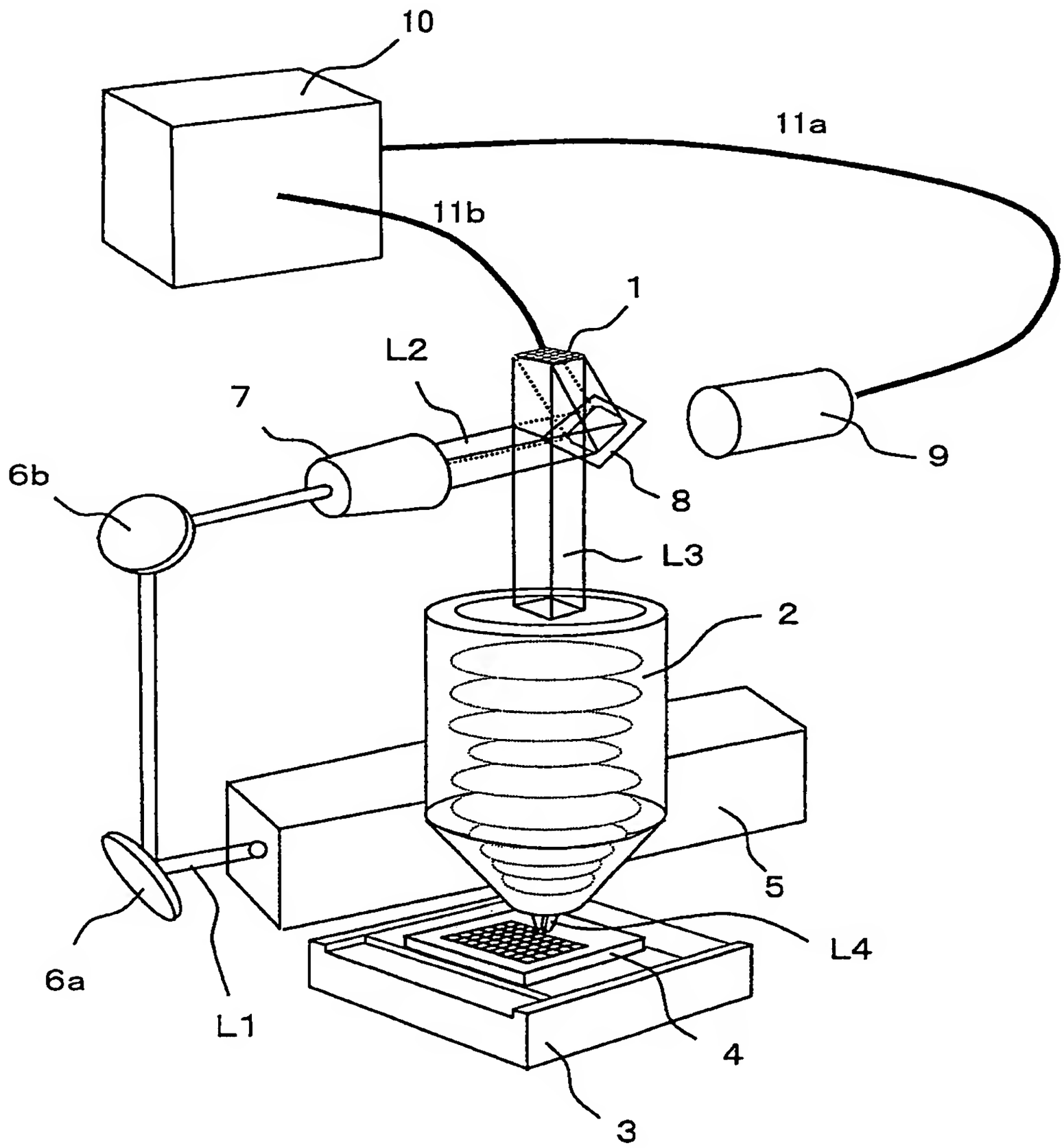


FIG. 19

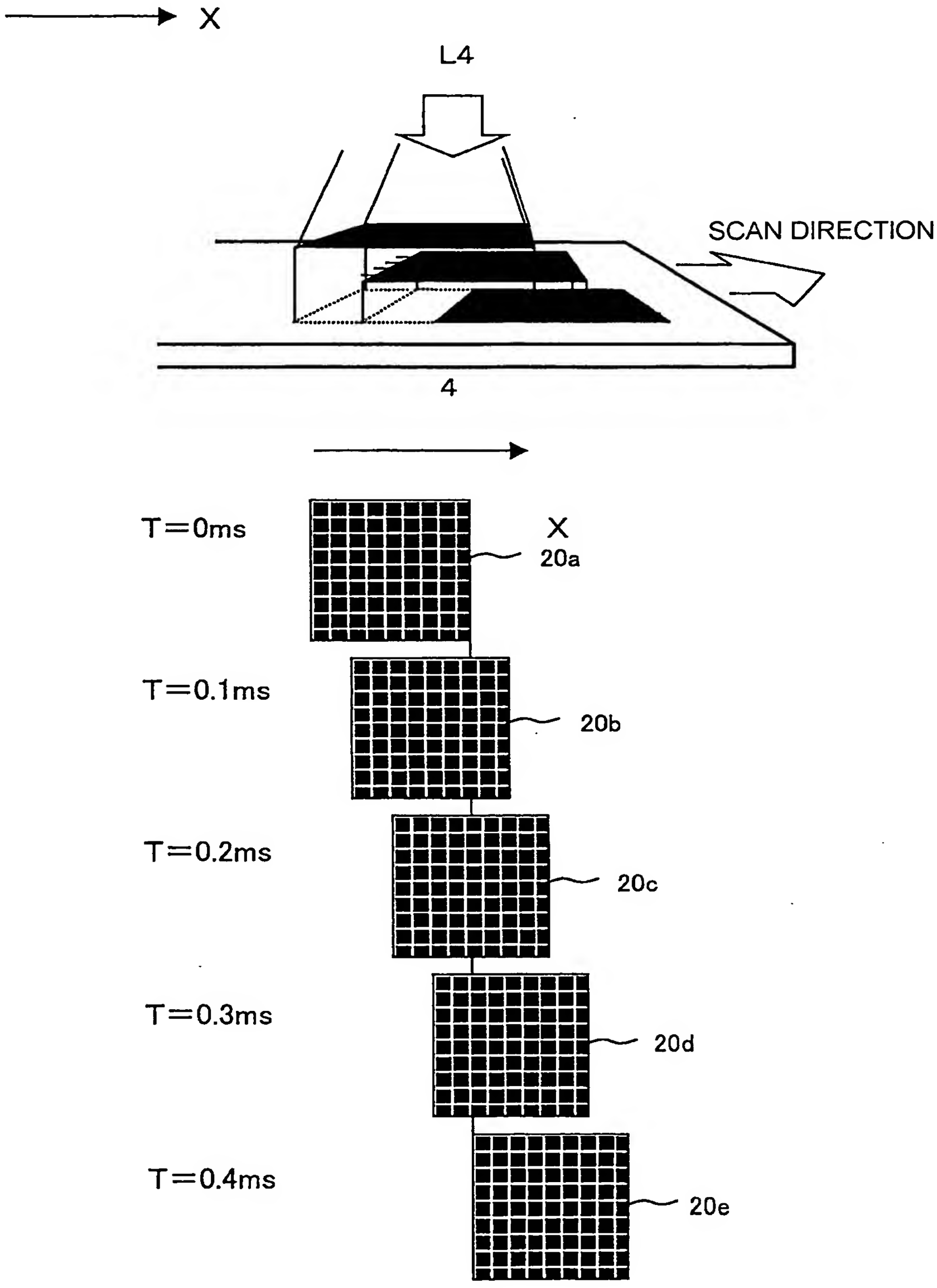

X
L4
SCAN DIRECTION
4
T=0ms
X
20a
T=0.1ms
20b
T=0.2ms
20c
T=0.3ms
20d
T=0.4ms
20e

FIG. 20

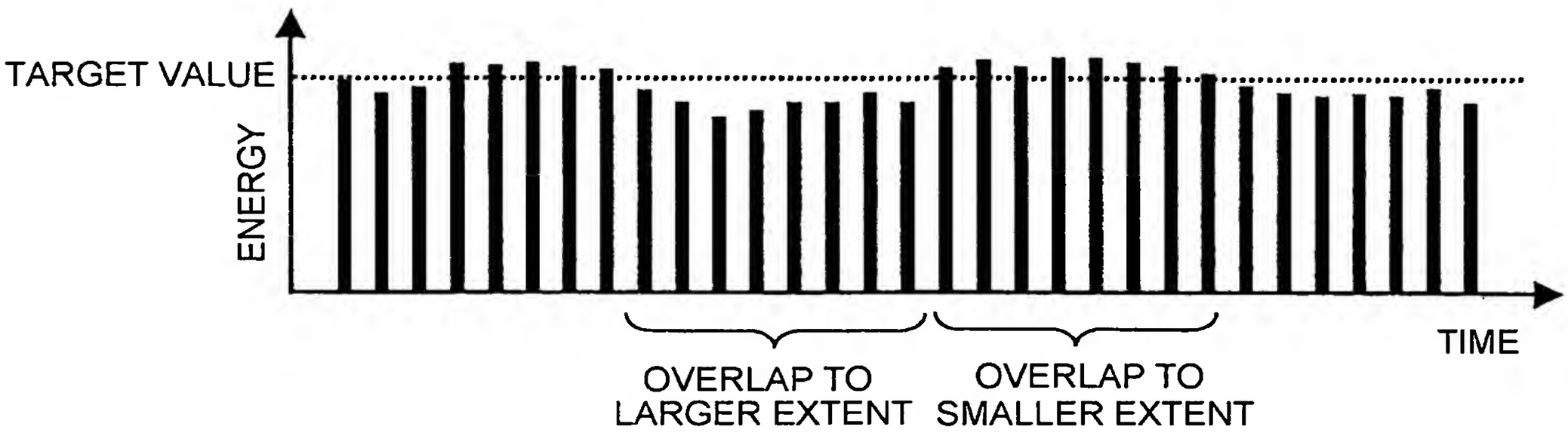


FIG. 21

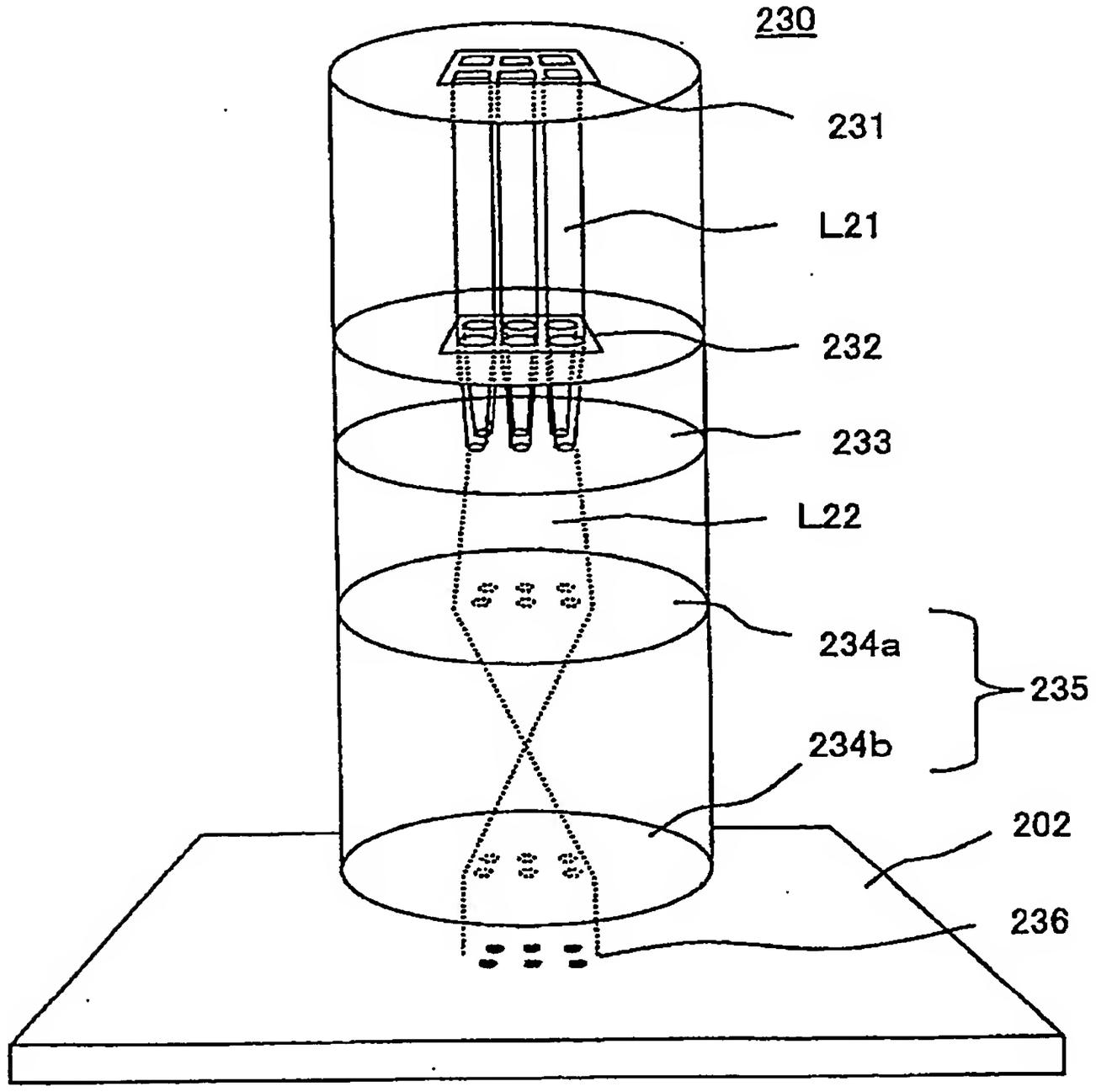


FIG. 22

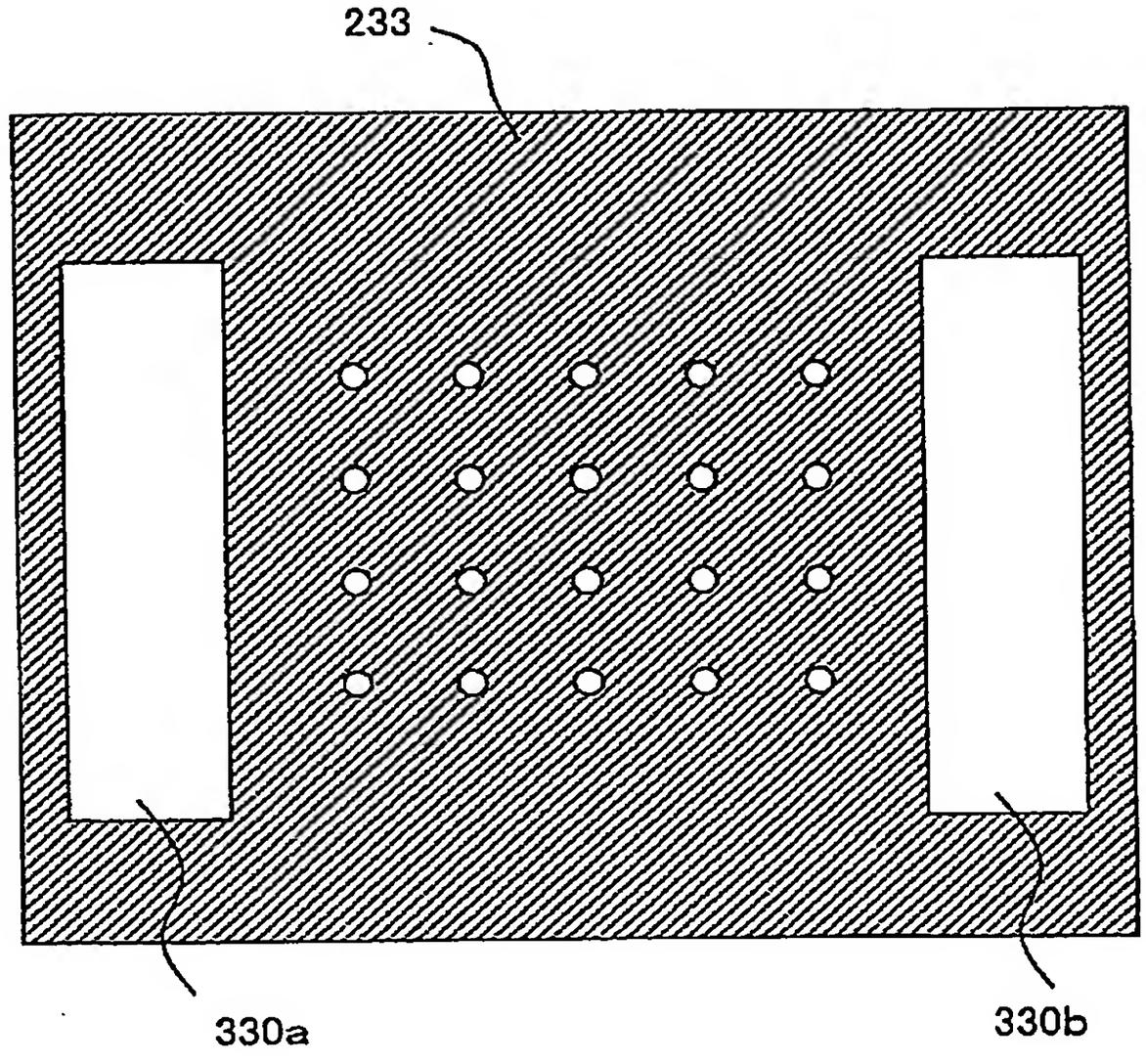


FIG. 23

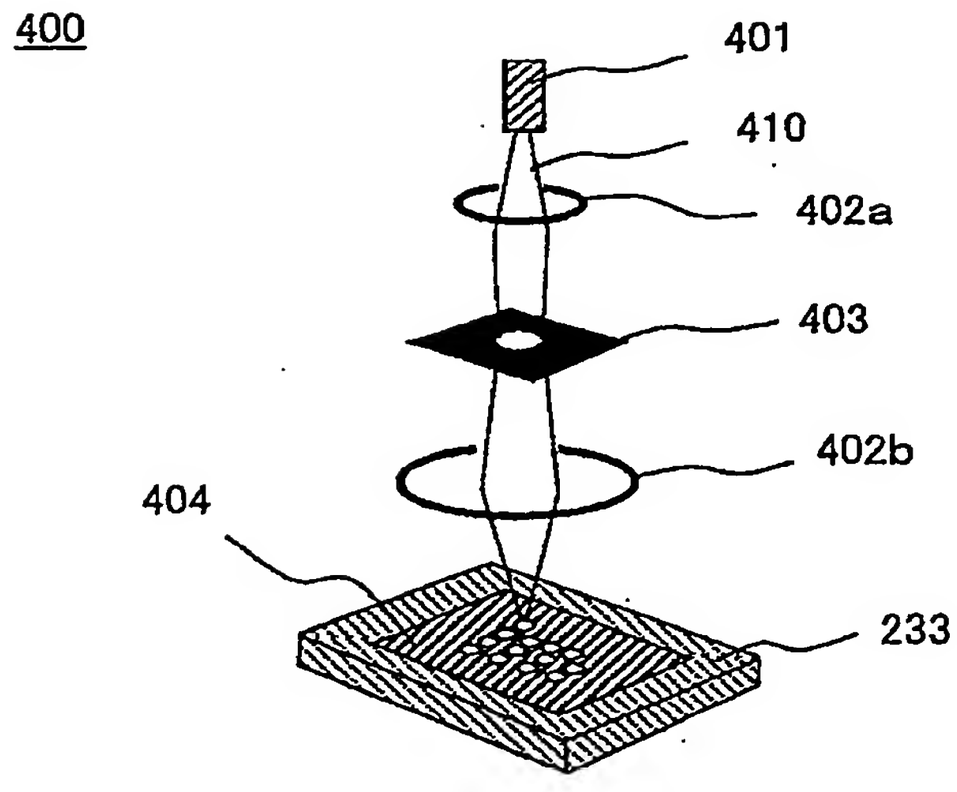


FIG. 24

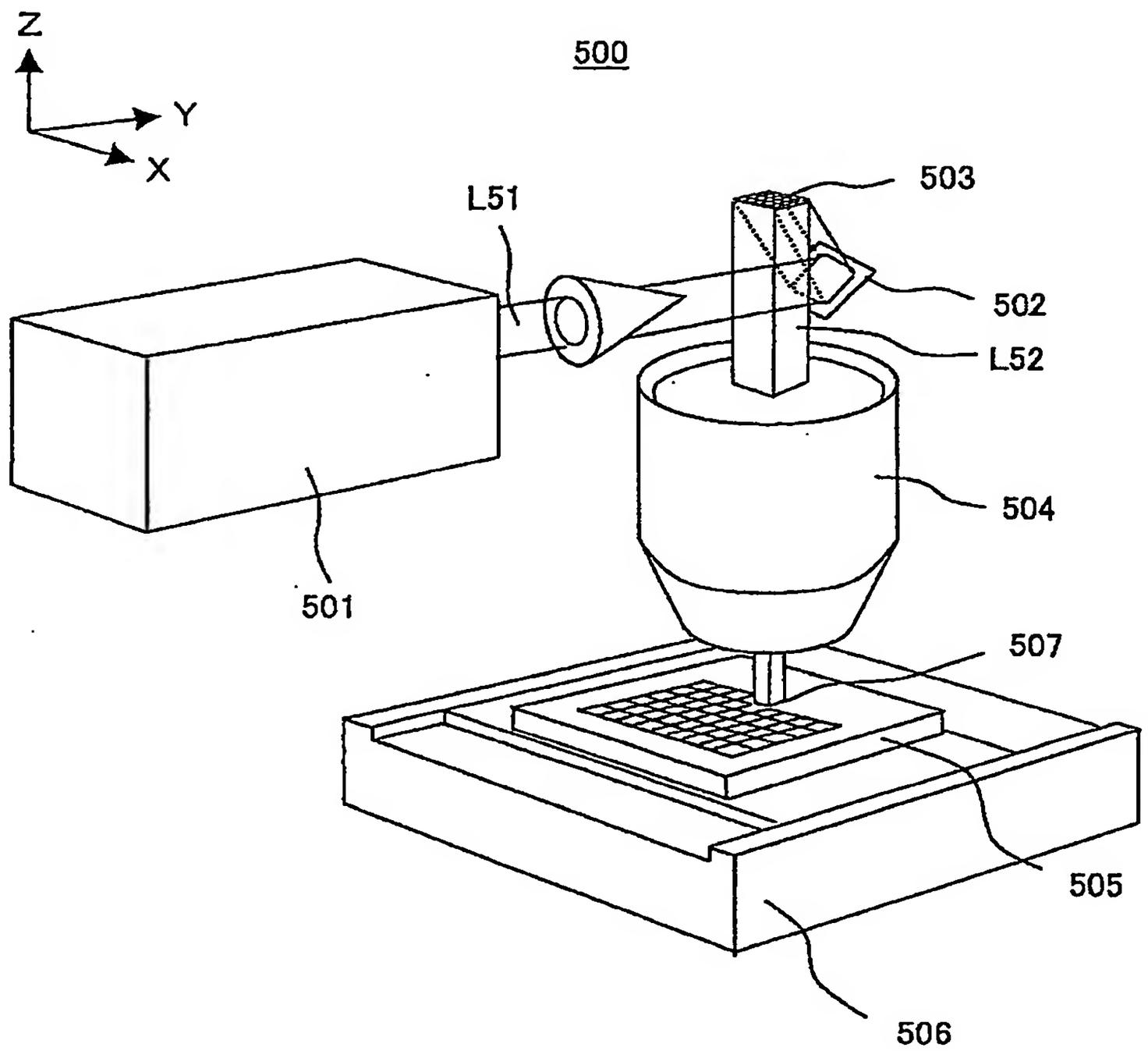
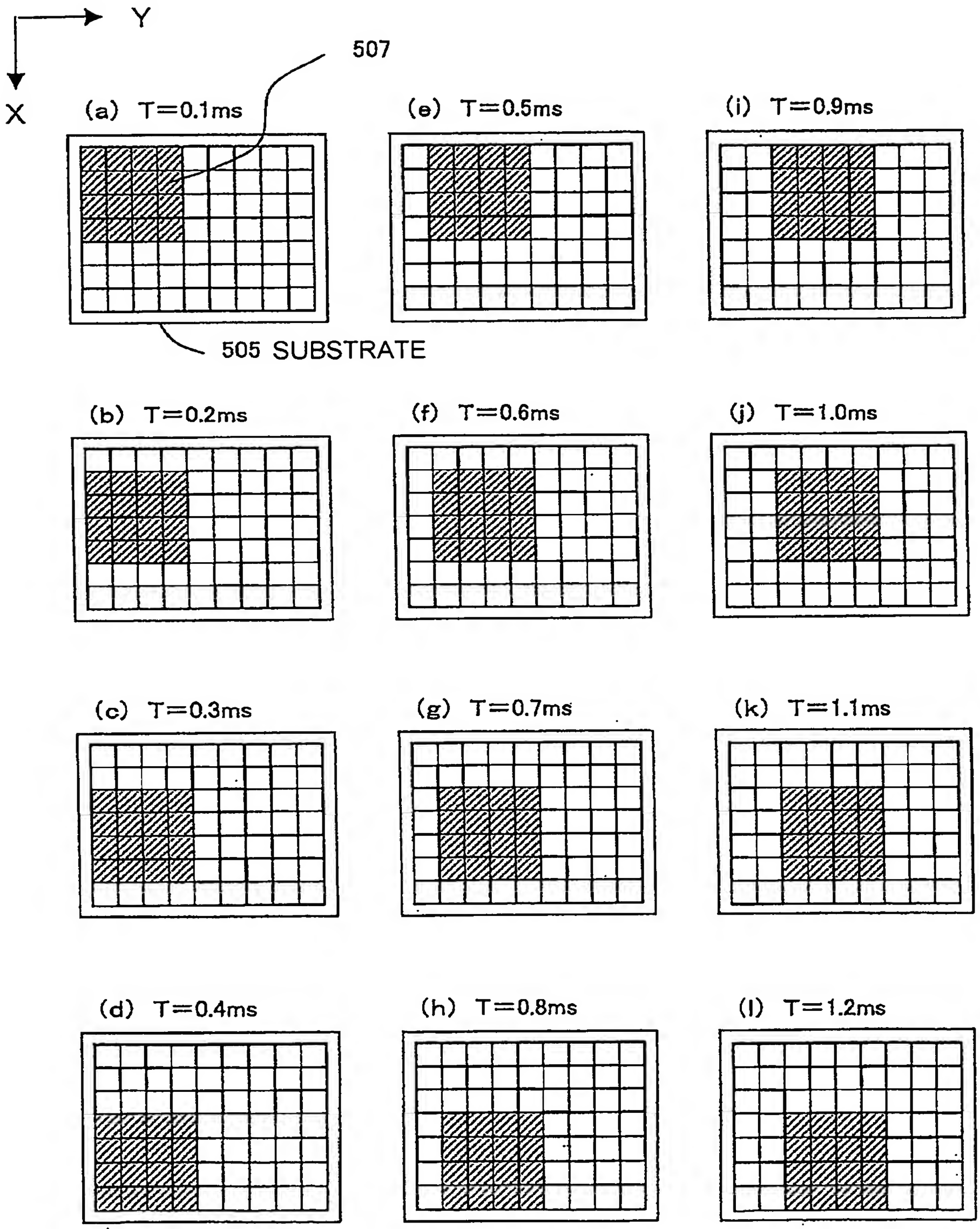


FIG. 25


Y
X
507
(a) T=0.1ms
(e) T=0.5ms
(i) T=0.9ms
505 SUBSTRATE
(b) T=0.2ms
(f) T=0.6ms
(j) T=1.0ms
(c) T=0.3ms
(g) T=0.7ms
(k) T=1.1ms
(d) T=0.4ms
(h) T=0.8ms
(l) T=1.2ms